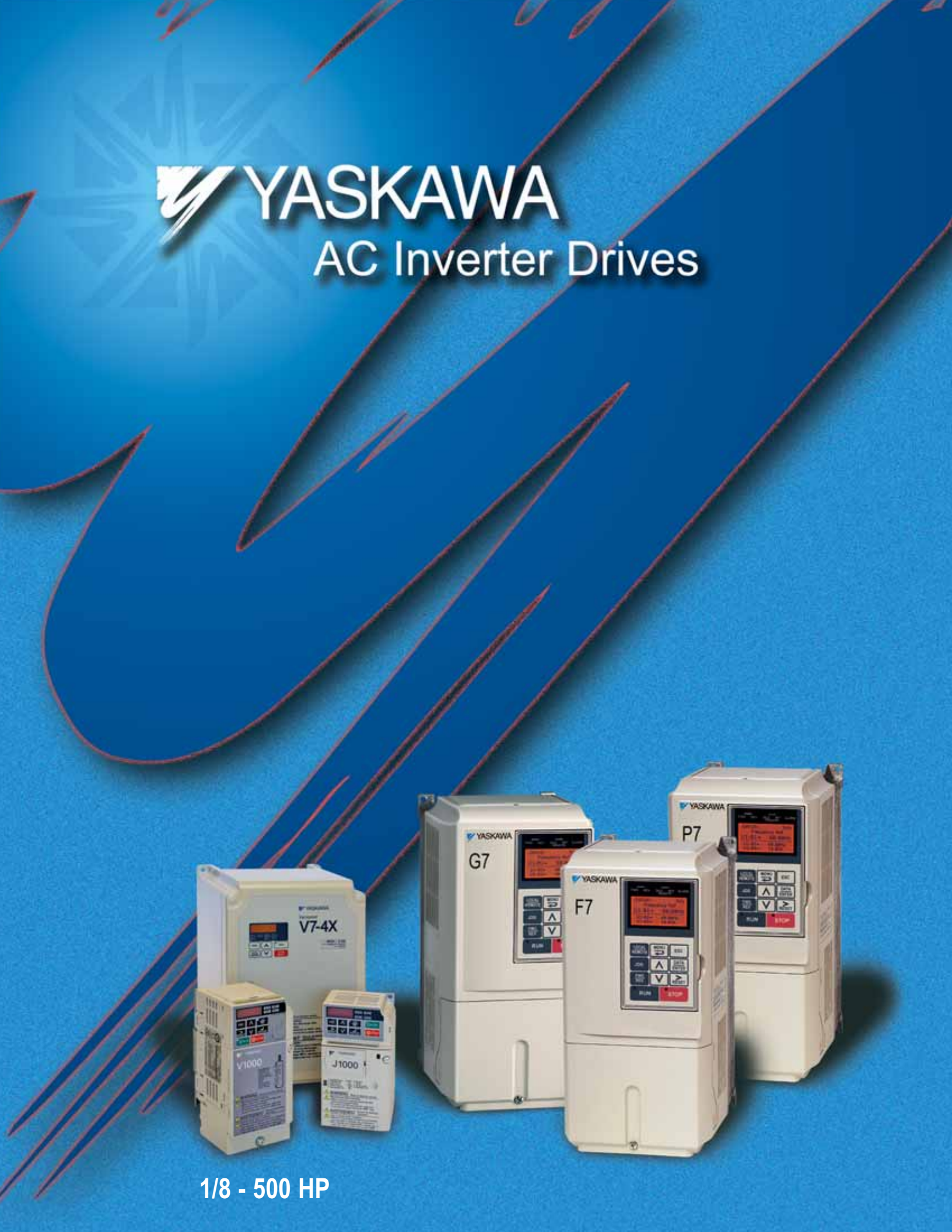
YASKAWA

AC Inverter Drives



1/8 - 500 HP

Yaskawa Advantages

Yaskawa AC Drives

Yaskawa Drives incorporate the latest technological advancements in AC induction motor speed control, made possible by experience and dedication to quality in design and manufacturing. The drives provide the benefits of network communications, support by software tools for parameter management, custom software options, and new ease of installation. Yaskawa is the world's largest manufacturer of AC drives and is celebrating over 90 years of service to industry. Yaskawa drives are manufactured in the United States, United Kingdom, Japan, China and other countries. Drive products are available in ratings fractional to 1500 HP.

The integral horsepower F7, G7, and P7 drives are available to 500 horsepower, and cover every automation application need in the industrial plant, from a simple fan drive to high performance torque control. The F7 drive is rated for normal or heavy duty, from ½ to 500 HP. The G7 drive is the extreme performance drive with heavy duty rating and the 3-level inverter design from ½ to 500 HP. The P7 drive is rated normal duty for fans and pumps from 5 to 500 HP.

The Microdrive collection includes the J1000, V1000, and V74X drives. These compact drives range from 1/8 to 25 HP and are ideal for machine mounting. The V1000 is an open-loop current vector drive with a very flexible feature set, from 1/8 to 25 HP. The V74X is an open-loop vector drive in an integral enclosure that meets NEMA and UL type 4X/12 standards and the IP66 rating of IEC 529. The J1000 drive is a simple V/f drive from 1/8 to 7.5 HP.

Performance and Technology

Yaskawa offers a range of performance choices and innovative technologies. Control methods include V/f, open loop current vector, closed loop vector control, open looop PM, and closed loop PM for speed regulation choices of 1%, 0.1% or 0.01%. The new high-slip braking feature is available for high inertia loads, without the need for dynamic braking resistors. Options for higher output frequency and zero-servo control are available. The award-winning 3-Level inverter architecture is available for 480V G7 drives to simplify installation designs. Yaskawa Drives offer real choices and real benefits.

Quality, Reliability, Customer Satisfaction

Yaskawa is the world leader in quality and reliability. Quality Magazine ranked Yaskawa among the top five companies for quality out of 800. As noted by Quality Magazine, all phases of Yaskawa's business - including research and development, supply chain management, production and quality control, sales and marketing as well as technical service and distribution - are committed to delivering top quality products and service.

With an ISO 9001:2000 system, a Supplier Rating Program, and rigorous testing, Yaskawa ensures that quality and reliability are designed in and built in. Field data confirms that calculated MTBF targets are exceeded in actual production units. Yaskawa is the only manufacturer in our field to receive the Deming Prize for quality.

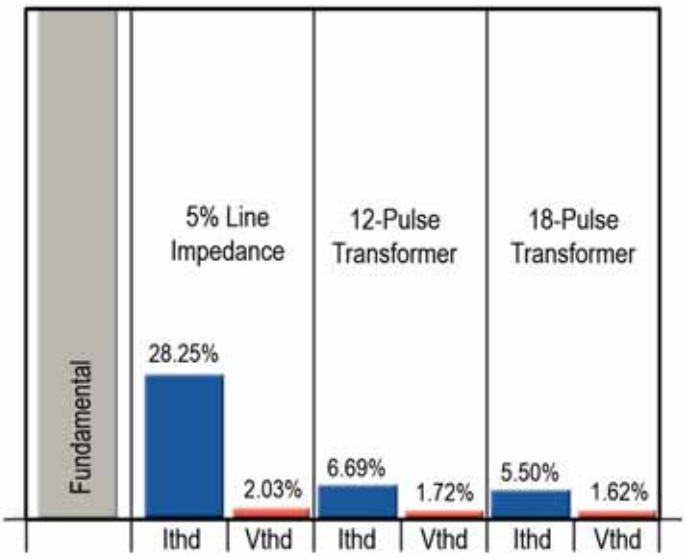
F7 G7 P7 J1000 V1000 V74X

Power Quality

Power quality is an issue of increasing significance. Yaskawa Drives up to 25 HP are available with optional 3% or 5% equivalent line impedance DC Bus Reactors. These optional DC Bus Reactors can reduce the total harmonic distortion.

At 30 HP and above, Yaskawa Drives include 3% line impedance as standard as well as a dual diode bridge rectifier which can be configured to accept 12-pulse (delta-delta and delta-wye secondary) transformer input. These transformers can be installed at our factory as an integral part of the drive package or purchased as a loose item, to eliminate power quality issues. Yaskawa Drives can also be factory configured with an integral 18-pulse transformer. These packages are typically used to meet the most strict harmonic requirements at both drive input terminals and the point of common coupling.

The data listed below was collected on a 75 HP, 480V drive and shows the different effects bus reactors, 12-pulse, and 18-pulse harmonic mitigation solutions have at the input terminals to the drive.



Current and Voltage Harmonic Distortion at Drive Input (% of Fundamental)

Easy To Use

Yaskawa Drives are factory-programmed and ready to run. For operational simplicity and clarity, the LCD operator in the F7, G7, P7 and V1000 drives has 5 lines x 16 characters. This display can be set to several international languages. The keypad is intuitive and includes parameter copying to move a chosen set of parameters from one drive to another. Parameters are grouped in two sets; Quick Start and Advanced. The USB Copy Unit allows the J1000 or V1000 drives to connect to the USB port on a PC. It can read, copy, and verify drive parameters from one drive to another like drive.

LCD Operator for F7, G7, and P7 drives

USB Copy Unit (optional)

Remote LCD Operator for V1000 drives (optional)

Remote LED Operator for J1000 drives (optional)

Yaskawa Advantages

Easy to Install and Service

All Yaskawa drives have a split cover for easy access to the power and control terminals. The power terminal compartment easily accommodates bend radius for cable connections. Control wires are connected to a detachable terminal board for ease of installation and maintenance.

Detachable cooling fans are easy to replace and on/off fan control can extend operating life. Accumulated operation time and cooling fan run time are recorded and can be displayed for preventive maintenance programs.

Start-up and configuration are simplified by the intuitive quick start programming menu and start-up guide in the user manual.

DriveWizard™ and DriveWizard™ Plus are PC-based support tools for drive commissioning and maintenance. They allow the user to operate the drive, change parameters, upload and download parameters, monitor and graph parameters, provide status and troubleshooting data, and utilize a host of additional features with built-in help menus.

Distribution Channel

Yaskawa Distributors are trained by Yaskawa and continually improve drive expertise through monthly web-based training. Most distributors have a resident Certified Drive Specialist on staff, which assures you the highest level of local support. Yaskawa has decades of motion and drive experience. Backed by Yaskawa Sales Engineers, our distributors can provide the best solution for the toughest applications. Our distribution channel provides added value by offering an array of complementary products.

CDS Certified Drive Specialist

Technical Training

Yaskawa provides standard and customized courses on most product lines, with hands-on activities and demonstrations, through factory classes, traveling road show classes, customer site classes, live web classes and e-Learning Modules. Yaskawa provides training that suits our customers' business plans and budgets. Yaskawa trainers are degreed engineers with extensive experience in industry and are product experts in their own right.

Traveling Road Show Van

Worldwide Services

Yaskawa offers worldwide support with application assistance, start-up, maintenance, troubleshooting and repair, as well as internet tools and telephone support. Sales and service offices are located around the world.

Through one website address, www.yaskawa.com, customers can access several Yaskawa global websites that best service their geographic area, in several languages. The websites have an extensive document and knowledge database. Customers can easily locate information, select products, as well as maintain products. Our FAQs cover many facets of ownership and are derived from our field and telephone assistance with our customers.

In the Americas, telephone assistance is available 24/7/365 at 800-YASKAWA (927-5292). Our phone support group is product certified to assist you with current and legacy drive requirements.

Yaskawa's Field Service personnel, and local Authorized Service Providers can provide on-site start-up assistance, troubleshooting and repair. Same day exchange units or fast turnaround repairs are available.

Drive Packaging Options

Yaskawa customers can enjoy more than the highest quality drives in the industry - they can specify the drives in preconfigured or custom engineered packages with a broad array of optional items. Specify NEMA Type 1, 12, or 3R enclosures. Select circuit breakers, disconnects, bypass contactors, dynamic braking resistors, reactors, space heaters, operator devices and more.

Yaskawa can also package drives with 12-pulse and 18-pulse input for applicable drives.

NEMA 3R (Bypass)

NEMA 12 FVFF (18-Pulse Input)

AC Drive Proc

Selection Matrix

Drive Name and Purpose	HP Range	Ratings Available	Overload	Speed Control				Braking	
				V/f	Open Loop Vector	Closed Loop Vector	Range	Dynamic Braking	Power Regeneration
F7 Industrial Workhorse General Purpose	1/2 to 500	3/4 500HP @ 480V 3∅ 1/2 150HP @ 230/240V 3∅	■ ■	●			1:40	●	●
					●		1:100	●	●
						●	1:1000	●	●
G7 Ultimate Performance Solution	1/2 to 500	3/4 500HP @ 480V 3∅ 1/2 150HP @ 240V 3∅	■	●			1:40	●	●
					●		1:200	●	●
						●	1:1000	●	●
P7 Industrial Fan/Pump Drive	5 to 500	5 500HP @ 480V 3∅ 5 150HP @ 230/240V 3∅	■*	●			1:40	●	
V1000 Compact Vector Control	1/8 to 25	1/2 25HP @ 480V 3∅ 1/8 25HP @ 240V 3∅ 1/8 5HP @ 240V 1∅	■ ■	●			1:40	●	
					●		1:100		
V74X Washdown and Dust-tight	1/8 to 15	1/8 15HP @ 460V 3∅ 1/8 10HP @ 230V 3∅	■	●			1:40	●	
					●		1:100		
J1000 Ultra Compact OEM Drive	1/8 to 7.5	1/2 7.5HP @ 480V 3∅ 1/8 5HP @ 240V 3∅ 1/8 3HP @ 240V 1∅	■ ■	●			1:40	●	

■ Heavy Duty Overload Current: 150% for 60 seconds

■ Normal Duty Overload Current: 120% for 60 seconds

* P7: 110% for 60 seconds

● Standard

● Option

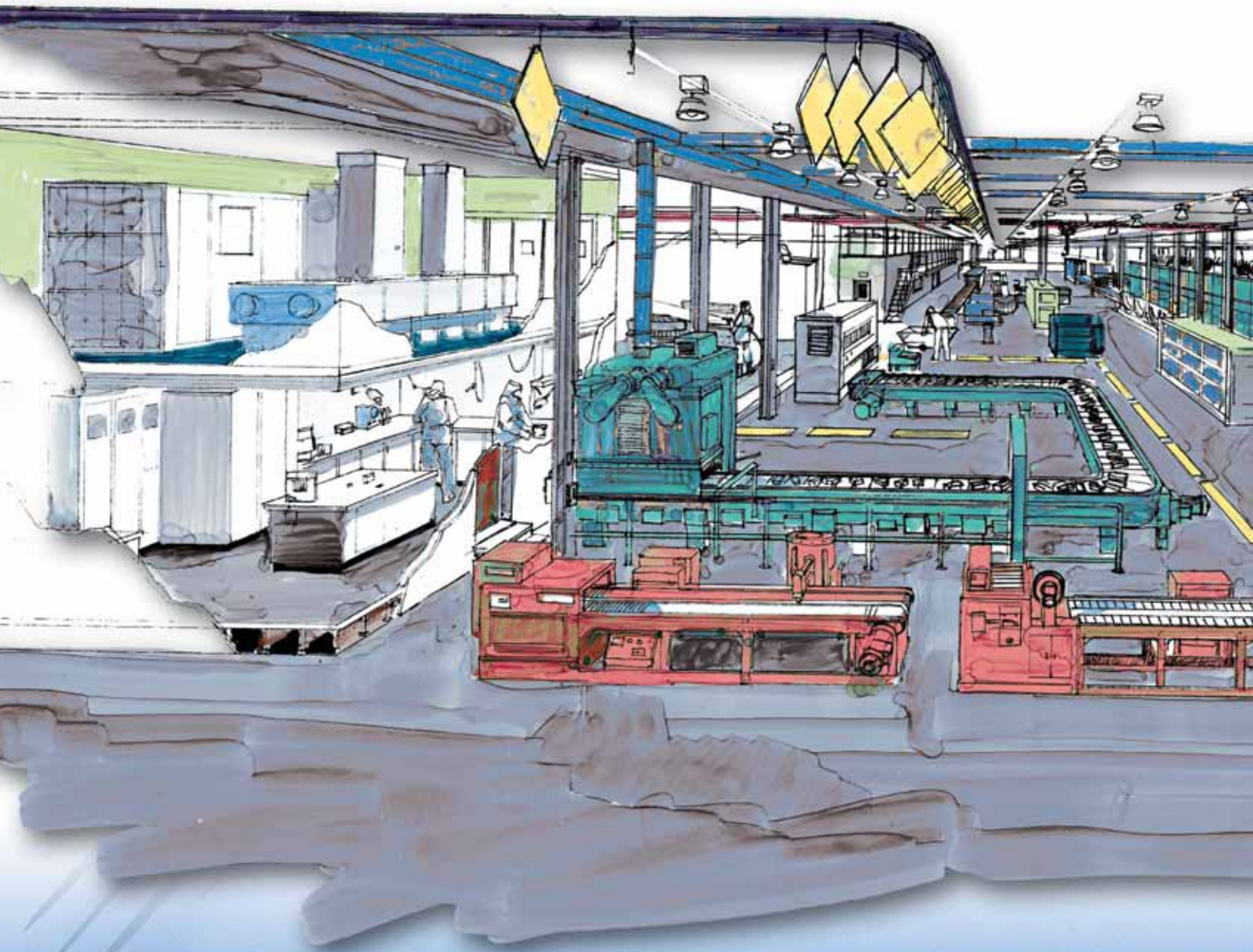
duct

Max Output Frequency	Inputs and Outputs							CASE Software	Standard Construction	Features
Standard (Optional)	Analog Input	Analog Output	Digital Input	Digital Output	Pulse Train Input	Pulse Train Output	RS 422/485 (baud)			
400Hz (1500Hz)	3	2	8	4	1	1	19.2k	●	NEMA 1 and Open Chassis	*For details see Flyer FL.F7.01* • Constant or variable torque operation (parameter selectable) • Closed or open loop vector control (parameter selectable) • Extensive set of hardware I/O and application software algorithms • Removable control circuit terminals and cooling fan • Auto-tuning function
400Hz	3	2	12	6	1	1	19.2k	●	NEMA 1 and Open Chassis	*For details see Flyer FL.G7.01* • 3-Level Inverter solves insulation and bearing failures (480V class) • Increased speed response (60Hz) and torque response (300Hz) • Systems-ready drive with networking and programming flexibility • DriveWorksEZ PC programming tool for advanced applications • Torque control with or without PG
120Hz	2	2	7	3			19.2k	●	NEMA 1 and Open Chassis	*For details see Flyer FL.P7.01* • Application functions (PI control, energy-saving control, etc.) • Removable control circuit terminals and cooling fan • Auto-tuning function
400Hz (1167Hz)	2	1	7	3	1	1	115.2k	●	NEMA 1	*For details see Flyer FL.V1000.01* • Compact, high-performance (vector control) • High-starting torque of 200% or more at 1Hz (vector control) • Possible to mount on DIN rail
400Hz	1	2	7	3	1	1	19.2k	●	NEMA 4X / 12	*For details see Flyer FL.V74X.01* • Compact, high-performance (vector control) • High-starting torque of 150% or more at 1Hz (vector control) • Perfect for harsh environments
400Hz	1	1	5	1			38.4k *Option*		Open Chassis	*For details see Flyer FL.J1000.01* • Ultra compact • Simple operation • Possible to mount on DIN rail

Industrial App

Drives for Every Spectrum

Every industrial manufacturing facility and processing plant is filled with opportunities for automation improvements, upgrades to modern drive technologies, cost savings and efficiency gains. Some applications are simple and obvious, handled by any one of the high quality drives on the market. Others are more challenging, requiring the right drive selection to guarantee the necessary performance and integration with plant communication and power distribution requirements. The Yaskawa Generation 7 Drives family makes it possible to cover every part of the complexity spectrum, with a single platform of drives, with the same proven reliability and quality, and with the same reputation for customer satisfaction.



F7 G7 P7 J1000 V1000 V74X

olications

Textile
P-jump Winders
Extruders
Tufting Machines
Dye Pumps

Packaging
In-feed / Out-feed
Case Packing
Bottling & Canning
Carton Manufacturing

Plastics & Rubber
Extruders
Blow Molding
Thermoforming
Injection Molding

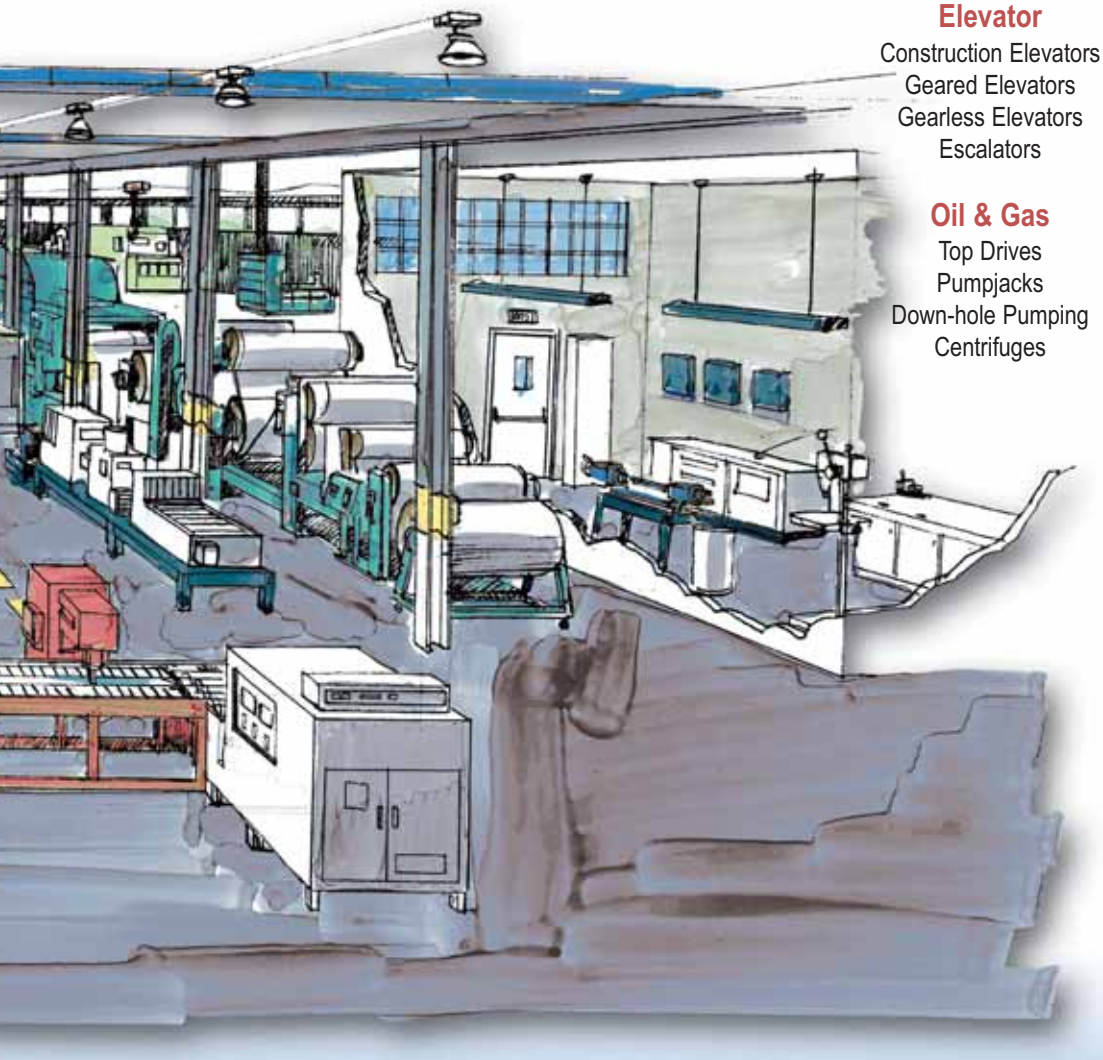
Pumping
Metering
Irrigation
Chillers
Positive Displacement

Pulp & Paper
Paper Machines
Debarkers
Winders
Saw Mills

Converting
Coaters
Laminators
Slitters
Flying Cutters

Air Handling
Supply and Return Fans
Cooling Towers
Spray Booths
Dryers

Laundry
Dryers
Extractors
Folders
Washers



Elevator
Construction Elevators
Geared Elevators
Gearless Elevators
Escalators

Material Handling
Conveyors
Sortation
Palletizers
Coil Winding

Oil & Gas
Top Drives
Pumpjacks
Down-hole Pumping
Centrifuges

Food & Beverage
Conveyors
Fillers
Mixers
Centrifuges

Metals
Stamping / Punch Press
Wind / Unwind
Cut-to-length
Wire Draw

Construction Materials
Kilns
Planers
Flying Cutoff
Mixers

Automotive
Stamping
Test Stands
Indexing
Metal Cutting

F7 Industrial Workhorse
Normal and Heavy Duty

1/2 - 500 HP

The F7 drive is the Industrial Workhorse of adjustable frequency drives. It is intended to handle every conventional drive application found in the typical industrial manufacturing plant from simple variable torque pumping to sophisticated networked material handling. With excellent performance and a wide array of configurations and options, the F7 can be the single drive platform for an entire facility. Network communications, plug-in I/O cards, custom software and power/packaging options are among the many choices. For new installations or retrofits, the F7 is truly the Industrial Workhorse, perfect for every conventional application…and even some unconventional ones.

Applications

- Conveyors
- Machine Tools
- PD and Centrifugal Pumps
- Extruders
- Mixers
- Cut-to-length
- Centrifuges
- Packaging Machines

Features

- Constant or variable torque operation for the flexibility to handle all industrial applications
- Rotational and static Auto-tuning for ease of motor configuration
- Closed or open loop vector can deliver outstanding starting torque and performance
- High speed current limiting to prevent nuisance trips
- High Slip Braking reduces installation cost and eliminates the need for additional braking
- Communication options that support all major industrial networks

For new installations or retrofits, the F7 is truly the Industrial Workhorse, perfect for every conventional application.

	200-240V (Three Phase)												200-230V (Three Phase)					
Model CIMR-F7U	20P41	20P71	21P51	22P21	23P71	25P51	27P51	20111	20151	20181	20221	20301	20370	20450	20550	20750	20900	21100
Max Applicable Motor Output HP HD	0.5	0.75	1	2	3	5	10	N/A	15	20	25	40	50	60	75	100	125	150
Max Applicable Motor Output HP ND	0.75	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150
Rated Output Amps HD	3.2	4.1	7	9.6	15	23	31	45	58	71	85	115	145	180	215	283	346	415
Rated Output Amps ND	3.6	4.6	7.8	10.8	16.8	23	31	46.2	59.4	74.8	88	115	162	192	215	312	360	415
Max Output Voltage	Three Phase 200-240V (proportional to input voltage)												Three Phase 200-230V (proportional to input voltage)					

	380-480V (Three Phase)																					
Model CIMR-F7U	40P41	40P71	41P51	42P21	43P71	45P51	47P51	40111	40151	40181	40221	40301	40371	40451	40551	40750	40900	41100	41320	41600	41850	42200	43000
Max Applicable Motor Output HP HD	0.75	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	150	N/A	200	250	300	400	500
Max Applicable Motor Output HP ND	0.75	1	2	3	5	7.5	10	20	25	30	N/A	50	60	75	100	125	150	200	N/A	250	350	450	500
Rated Output Amps HD	1.8	2.1	3.7	5.3	7.6	12.5	17	24	31	39	45	60	75	91	112	150	180	216	260	304	370	506	675
Rated Output Amps ND	1.8	2.1	3.7	5.3	7.6	12.5	17	24	34	40	50.4	67.2	77	96	125	156	180	240	260	304	414	515	675
Max Output Voltage	Three Phase 380-480V (proportional to input voltage)																						

Ultimate Performance G7 3-Level Inverter

1/2 - 500 HP

This amazing AC drive is the ultimate performance solution with increased speed and torque response to provide servo-like performance from an induction motor in speed, torque or position control applications. In addition, the G7 has the world's first 480V 3-level inverter architecture that eliminates or minimizes the installation problems associated with IGBT switching (very long cable lengths, bearing currents, and common mode currents) and protects the entire motor-drive system. For more detail on 3-level inverters, please refer to page 18 "G7 Three-Level Inverter." The G7 can be programmed using DriveWorksEZ™. This is a PC-based, object-oriented, graphical icon, programming tool that is friendly to the user.

The G7 drive offers the ultimate performance, the best system protection, and the most flexible configurations of any drive available.

Applications

- Extrusion
- Test Stands
- Coordinated Systems
- Long length motor cables
- Converting
- Winding
- Sectional Machine Control
- Motors with bearing life issues

Features

- 3-Level inverter architecture for reduced motor-drive system issues
- Increased speed / torque response (60Hz / 300Hz) for servo-like motor control
- New open loop control method resulting in true torque control without an encoder
- Heavy duty overload capacity for demanding applications: 150% for 1 minute, 200% for 0.5 seconds
- Full torque limiting capability with all 4 operation quadrants individually set
- Systems-ready drive with increased networking and programming flexibility
- Increased I/O count including 12 digital inputs and 6 digital outputs
- DriveWorksEZ™ PC graphical drive programming tool for application solutions

	200-240V (Three Phase)												200-230V (Three Phase)					
Model CIMR-G7U	20P41	20P71	21P51	22P21	23P71	25P51	27P51	20111	20151	20181	20221	20301	20370	20450	20550	20750	20900	21100
Max Applicable Motor Output HP	0.75	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150
Rated Output Amps	3.2	6	8	12	18	27	34	49	66	80	96	130	160	183	224	300	358	415
Max Output Voltage	Three Phase 200-240V (proportional to input voltage)												Three Phase 200-230V (proportional to input voltage)					

	380-480V (Three Phase																					
Model CIMR-G7U	40P41	40P71	41P51	42P21	43P71	45P51	47P51	40111	40151	40181	40221	40301	40370	40450	40550	40750	40900	41100	41320	41600	41850	42200	43000
Max Applicable Motor Output HP	0.75	2	3	3	5	10	15	20	25	30	40	50	60	75	100	125	150	200	200	250	300	350	500
Rated Output Amps	1.8	3.4	4.8	6.2	9	15	21	27	34	42	52	65	80	97	128	165	195	240	270	325	370	450	605
Max Output Voltage	Three Phase 380-480V (proportional to input voltage)																						

P7 Normal Duty Industrial Fan/Pump

5 - 500 HP

The P7 is the Industrial Fan and Pump drive. It is the companion to the F7 drive in fit and form. Its functionality is designed for variable torque applications like fans and centrifugal pumps. It is supplied with V/f control and Normal Duty overload rating of 110% for one minute. Network communications, plug-in I/O cards, and power/packaging options are available. With an optional phase-shifting input transformer, the P7 dual-diode bridge can be operated in 12-pulse rectification mode, reducing input current harmonic distortion. The optional P7 Bypass package is a 3-contactor style bypass, allowing motor operation from the drive or across the line.

Applications

- Centrifugal Pumps
- Blowers
- Dryers
- Chillers
- Fans
- Spray Booths
- Centrifuges
- Cooling Towers

Features

- Variable torque, normal duty ratings
- Speed Search (bi-directional) reduces down time due to overload trips
- Enhanced energy-saving control shortens the payback period due to reduced energy costs
- PI function for process control without the need for additional hardware
- Copy keypad function for convenient parameter uploading and downloading
- Communication options that support all major industrial and commercial networks

The P7 drive has been designed specifically for fan and pump applications.

	200-240V (Three Phase)								200-230V (Three Phase)					
Model CIMR-P7U	23P71	25P51	27P51	22011	20151	20181	20221	20301	20370	20450	20550	20750	20900	21100
Max Applicable Motor Output HP	5	7.5	10	15	20	25	30	40	60	75	75	100	125	150
Rated Output Amps	16.8	23	31	46.2	59.4	74.8	88	115	162	192	215	312	360	415
Max Output Voltage	Three Phase 200-240V (proportional to input voltage)								Three Phase 200-230V (proportional to input voltage)					

	380-480V (Three Phase)																			
Model CIMR-P7U	43P71	44P01	45P51	47P51	40111	40151	40181	40221	40301	40371	40451	40551	40750	40900	41100	41320	41600	41850	42200	43000
Max Applicable Motor Output HP	5	5	7.5	10	20	25	30	30	50	60	75	100	125	150	200	200	250	350	450	500
Rated Output Amps	7.6	8.7	12.5	17	27	34	40	50.4	67.2	77	96	125	156	180	240	260	304	414	515	675
Max Output Voltage	Three Phase 380-480V (proportional to input voltage)																			

Great Things Come in Small Packages J1000

1/8 - 7.5 HP

The J1000 drive is a general purpose AC drive; its PWM design provides low motor noise and high starting torque, with a heavy duty current overload rating of 150% for 60 seconds and a normal duty current overload rating of 120% for 60 seconds. V/f control makes this drive suitable for most general applications. The J1000 is feature-packed, low cost and compact. The digital operator includes a 5-digit LED status display. The J1000 has five multi-function digital inputs, 1 multi-function analog input, 1 multi-function digital output, and 1 multi-function analog output. An optional RS-422/485 Modbus RTU serial communication port is available. An ideal choice whenever low cost and small size are required.

J1000 is the OEM's choice whenever low cost, simplicity, and micro-size drives are required.

Applications

- Conveyors
- Centrifuges
- Fans
- Mixers
- Automotive Assembly
- Material Handling
- Grinders
- Pumps
- Blowers
- Commercial Laundry
- Packaging Equipment
- Food Processing

Features

- Copy function for convenient parameter storage and recall (requires remote LED operator or copy unit/Y-stick)
- Digital operator interface for easy and quick configuration
- Speed search function for automatic restart after power loss
- Compact space saving design with side-by-side mounting
- Dynamic braking transistor standard on all models
- RoHS compliant on all models
- Dual rating: Normal duty and heavy duty
- Swing PWM function to decrease noise at low carrier frequencies
- Ingenious pre-maintenance function

		200-240V (Single/Three Phase)						
Model CIMR-JU	Three-Phase*	2A0001	2A0002	2A0004	2A0006	2A0010	2A0012	2A0020
	Single-Phase	BA0001	BA0002	BA0003	BA0006	BA0010	BA0012	BA0018
Max Applicable Motor Output HP	ND	1/4	1/4	3/4	1	3	3	5
	HD	1/8	1/4	1/2	1	2	3	5
Rated Output Amps	ND	1.2	1.9	3.5**	6.0	9.6	12.0	19.6
	HD	0.8	1.6	3.0	5.0	8.0	11.0	17.5
Max Output Voltage		Three Phase 200-230V (proportional to input voltage)						

		380-480V (Three Phase)						
Model CIMR-JU	Three-Phase*	4A0001	4A0002	4A0004	4A0005	4A0007	4A0009	4A0011
Max Applicable Motor Output HP	ND	1/2	1	2	3	4	5	7.5
	HD	1/2	3/4	2	3	3	4	5
Rated Output Amps	ND	1.2	2.1	4.1	5.4	6.9	8.8	11.1
	HD	1.2	1.8	3.4	4.8	5.5	7.2	9.2
Max Output Voltage		Three Phase 380-480V (proportional to input voltage)						

* For Single-phase applications, derate the three phase drive by 50%.
** 3.3 for single phase amps

V1000 A World of Power in the Palm of your hand

1/8 - 25 HP

The V1000 Series is a high performance line of AC microdrives with low motor noise and high starting torque. It provides two control methods; V/f and open loop current vector control for precise speed regulation and higher torque at lower speeds. The V1000 is intended for either heavy duty applications (overload rating of 150% for 60 seconds) or normal duty applications (overload rating of 120% for 60 seconds). The V1000 Series is the perfect choice wherever high performance in a small size is required.

Applications

- Conveyors
- Pumps
- Mixers
- Packaging
- Machine Tools
- Grinders
- Material Handling
- Food Processing
- Commercial Laundry
- Fans

Features

- Vector control without feedback can deliver excellent starting torque and performance
- PID function with loss of feedback for process control without additional hardware
- Copy keypad function for convenient parameter uploading and downloading
- Communication options that support all major industrial networks
- Compact space saving design with side-by-side mounting
- Dynamic braking transistor standard on all models
- RoHS compliant on all models
- Permanent magnet synchronous motor (PM) operation
- Application presets
- Removable terminal block with parameter backup function
- Super-fast 2ms scan rate with dual CPU
- EN954-1 Safety Category 3, Stop Category 0
- Modbus Communication up to 115 kbps
- Swing PWM function to decrease noise at low carrier frequencies
- Ingenious pre-maintenance function

V1000 drives are the best in class choice whenever excellent performance, flexibility and compact size drives are required.

		200-240V (Single/Three Phase)										
Model CIMR-VU	Three-Phase*	2A0001	2A0002	2A0004	2A0006	2A0010	2A0012	2A0020	2A0030	2A0040	2A0056	2A0069
	Single-Phase	BA0001	BA0002	BA0003	BA0006	BA0010	BA0012	BA0018	-	-	-	-
Max Applicable Motor Output HP	ND	1/4	1/4	3/4	1	3	3	5	10	10	20	25
	HD	1/8	1/4	1/2	1	2	3	5	7.5	10	15	20
Rated Output Amps	ND	1.2	1.9	3.5**	6.0	9.6	12.0	19.6	30	40	56	69
	HD	0.8	1.6	3.0	5.0	8.0	11.0	17.5	25	33	47	60
Max Output Voltage		Three Phase 200-240V (proportional to input voltage)										

		380-480V (Three Phase)										
Model CIMR-VU	Three-Phase*	4A0001	4A0002	4A0004	4A0005	4A0007	4A0009	4A0011	4A0018	4A0023	4A0031	4A0038
Max Applicable Motor Output HP	ND	1/2	1	2	3	4	5	7.5	10	15	20	25
	HD	1/2	3/4	2	3	3	4	5	10	10	15	20
Rated Output Amps	ND	1.2	2.1	4.1	5.4	6.9	8.8	11.1	17.5	24	31	38
	HD	1.2	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18	24	31
Max Output Voltage		Three Phase 380-480V (proportional to input voltage)										

The standard V1000 can accept CASE custom software to add functionality to the drive by reconfiguring drive defaults, establishing presets for OEM equipment, and by eliminating peripheral controls and PLCs. Plug-in interface option boards enable the V1000 to communicate with all the major industrial networks. The V1000 is available from 1/8 through 25 horsepower.

* For Single-phase applications, derate the three phase drive by 50%.

** 3.3 for single phase amps

Washdown V74X Dust-tight

1/8 - 15 HP

This AC drive enclosure meets NEMA type 4X/12 indoor use requirements, UL type 4X/12 standards, and the IP66 rating of IEC 529. This enclosure provides the protection required in tough washdown or dust-tight environments. The cast enclosure is powder-coated to protect against the harmful effects of sanitizing chemicals commonly used in food industries.

Applications

- Food and Beverage
- Packaging
- Woodworking
- Refrigeration
- Metal Machining
- Pumping
- Printing

V74X drives have two control methods, V/Hz and open loop vector, which allows speed/torque performance to suit the application.

Features

- Meets NEMA Type 4X/12 indoor use requirements
- UL Type 4X/12 Standards
- IP66 rating of IEC529
- Vector control without feedback can deliver excellent starting torque and performance
- High speed current limit function to eliminate nuisance trip
- PID function with loss of feedback for process control without additional hardware
- Copy keypad function for convenient parameter uploading and downloading
- Digital operator interface for easy and quick configuration
- Speed search function for automatic restart after power loss
- Communication options that support all major industrial networks
- Dynamic Braking Transistor is standard for low cost braking with optional resistor

	200-230V (Single/Three Phase)									380-460V (Three Phase)								
Model CIMR-V7CU Three-Phase*	20P14	20P24	20P44	20P74	21P54	22P24	23P74	25P54	27P54	40P24	40P44	40P74	41P54	42P24	43P04	43P74	45P54	47P14
Max Applicable Motor Output HP	0.125	0.25	0.5	1	2	3	5	7.5	10	0.5	0.75	2	3	3	3	5	10	15
Rated Output Amps	0.8	1.6	3	5	8	11	17.5	27	36	1.2	1.8	3.4	4.8	5.5	7.2	9.2	14.8	21
Max Output Voltage	Three Phase 200-230V (proportional to input voltage)									Three Phase 380-460V (proportional to input voltage)								

* For Single-phase applications, derate the three phase drive by 50%.

Yaskawa AC D

Common Specifications an

Yaskawa Drives range in horsepower from 1/8 to 500 HP. These AC drives incorporate the latest technological advancements and award winning designs. Yaskawa Drives have capabilities for popular network communications, the ability to accept customer-specific or application-specific software, and are supported by software tools for parameter management. The following specifications are common to all Yaskawa Drives.

Performance Features

- Adjustable S-curve accel/decel
- DC injection braking: at start or stop, adjustable, current-limited
- Power loss ride-thru
- Frequency resolution: 0.01 Hz with digital reference, 0.06 / 60 Hz with analog reference
- Frequency accuracy: 0.01% with digital command, 0.5% with analog command
- Volts / frequency ratio: fully adjustable pattern
- Drive efficiency: 96 to 98%
- Displacement power factor: 0.98
- Output frequency (max): 400 Hz**
- Torque boost: full range and auto
- Speed search: selectable auto restart
- Critical frequency rejection settings

Protective Features

- Torque limit
- Heat sink over-temperature
- Current-limiting DC bus fuse
- Electronic motor overload (UL 508C)
- Phase-to-phase and ground fault short circuit protection
- Current limit
- Over / Under torque protection
- Over / Under voltage protection
- Short circuit current rating: 30kA rms symmetrical (J1000, V1000) and 100kA rms symmetrical (F7, G7, P7)
- Input / output phase loss protection
- Optically-isolated controls
- DC bus charge indicator
- Motor thermistor input

Design Features

- Copy keypad function
- Digital keypad operator
- RJ-45 Style digital operator connector
- 24 VDC control logic for sourcing or sinking outputs (PNP or NPN)
- Multi-speed settings plus jog speed
- Carrier frequency: selectable
- Dynamic braking
- Flash RAM software memory for update
- Common DC bus capability
- DC link choke: 30 HP and above
- Split front cover for easy wiring
- Heat sink fan: Plug-in with on-off control

Service Conditions

- Ambient service temperatures: -10° to 40°C (104°F) NEMA 1, -10° to 45°C (113°F) -10° to 50°C (113°F) protected chassis (V1000, J1000)
- Ambient storage temperature: -20° to 60°C (-4° to 140°F)
- Input frequency: 50 / 60Hz ± 5%
- Input voltage: +10% / -15%, 3 phase, 200 to 240VAC, 380 to 480VAC, phase insensitive
- Humidity: Non-condensing, 95% RH maximum
- Altitude: 3300 feet (1000 meters) higher by derate
- Vibration: 1G (10 to 20Hz), 0.6G or less (20 to 55Hz)

Inputs and Outputs

- Analog inputs: programmable, -10 to +10VDC or 4 to 20mA
- Analog outputs: programmable, 0 to +10VDC
- Digital inputs: programmable multi-function, sinking or sourcing
- Digital outputs: programmable
- Pulse train input: 1 programmable, 30 kHz max *
- Pulse train output: 1 programmable, 30 kHz max *
- Fault contact: 1 form C
- RS-232/422/485: Modbus RTU protocol - 19.2 to 115 kbps (not J1000)

Standards & Reliability

- UL, cUL and CE
- MTBF: Exceeds 28 years
- Tested on fully-loaded motors
- Surface mount technology
- Protective PCB Coating

Options

- Remote digital operator kit
- Input circuit breaker / disconnect
- Input fuses
- 120VAC interface *
- NEMA 1, 12 or 3R enclosures
- Input/output reactors
- Dynamic braking resistors and modules
- EMC-compliant filters
- DC bus choke if not standard

* Does not apply to J1000
** P7 Output Frequency (max): 120 Hz

Drives
d Options

Option Type	Option Description	Part Number	Applicable Drive					
			F7	G7	P7	V1000	V74X	J1000
Network Communications	DeviceNet Communication Kit	SI-N3/V				●		
	DeviceNet Communication Kit	CM052					●	
	DeviceNet Communication Kit	CM056	●					
	DeviceNet Communication Kit	CM057		●				
	DeviceNet Communication Kit	CM058			●			
	DeviceNet Communication Kit	CM059	●	●				
	Modbus TCP/IP Communication Kit	CM090	●	●	●			
	Modbus TC/IP Communication Kit	SI-EM3/V				●		
	EtherNet/IP Communication Kit	CM092	●	●	●			
	EtherNet/IP Communication Kit	SI-EN3/V				●		
	LonWorks Communication Kit	CM048	●	●	●			
	Modbus Plus Communication Kit	CM071	●	●	●			
	Profibus DP Communication Kit	CM061	●	●	●			
	Profibus DP Communication Kit	SI-P3/V				●		
	Profibus DP Communication Kit	CM067					●	
	RS-232 Modbus RTU Communication Kit	SI-232/J						●
	RS-485 Modbus RTU Communication Kit	SI-485/J						●
Analog Inputs	Analog Input 3-15 PSI Transducer Kit	AI-010	●	●	●			
	Analog Input Kit (1 Input @ 0-10VDC, 1 Input @ 4-20mA)	AI-14U	●	●				
	Analog Input Kit (3 Selectable, +/-10VDC or 4-20mA)	AI-14B	●	●				
	Analog Input Trim Potentiometer Kit	AI-001	●	●	●			
	Auxiliary Analog Input Cable	AI-030					●	
	Analog Potentiometer Card	AI-V3/J						●
	Isolated Analog Input Kit (3 Selectable, +/-10VDC or 0/4-20mA)	AI-040	●	●				
Digital Inputs	120VAC Logic Interface Kit (8 Inputs)	DI-001	●	●				
	120VAC Logic Interface Kit (7 Inputs)	DI-002			●			
	120VAC Logic Interface Kit (4 Inputs)	DI-003		●				
	120VAC Logic Interface Kit (7 Inputs), Frames 1 & 3	DI-004					●	
	120VAC Logic Interface Kit (7 Inputs), Frame 2	DI-005					●	
	Digital Input Kit (12/16 Data Inputs, BCD or Binary)	DI-16H2	●	●				
	Digital Input Kit (8 Data Inputs, BCD or Binary)	DI-08	●	●				
Analog Outputs	Analog Output Kit (2 Outputs, +/-10VDC)	AO-12	●	●				
	Analog Output Kit (2 Outputs, 0-10VDC)	AO-08	●	●				
	Isolated Analog Output Kit (2 Selectable, +/-10VDC or 0/4-20mA)	AO-001	●	●				
	Terminal Board (2 Channels, 4-20mA)	ETC618121			●			
Digital Outputs	Digital Output Kit (2 Form A, 6 PHC)	DO-08	●	●				
	Digital Output Kit (2 Form C)	DO-02C	●	●				
Encoder (PG) Inputs	Dual PG Feedback Kit (Differential Line Driver)	PG-W2	●	●				
	PG Feedback Kit (Differential Line Driver)	PG-X2	●	●				
	PG Feedback Kit (Differential Open Collector)	PG-B2	●	●				
	PG Feedback Kit (Single Ended Line Driver)	PG-D2	●	●				
	PG Feedback Kit (Single Ended Open Collector)	PG-A2	●	●				
Remote Operators	Remote Operator Kit, NEMA 12 (3 & 10 Feet)	UUX000444	●	●	●			
	Remote Operator, LCD	JV0P-180				●		
	Remote Operator, LED	JV0P-182						●
Remote Operator Cables	Remote Operator Cable (3 feet)	UWR0051	●	●	●	●		●
	Remote Operator Cable (10 feet)	UWR0052	●	●	●	●		●
PC Interface Cables	Computer Interface Cable (6 feet)	UWR00468-2	●	●	●	●	●	●
DriveWizard	DriveWizard Kit including Interface Cable	DWST616-C1	●	●	●		●	
	DriveWizard Kit including Interface Cable	DWST616-C2	●	●	●		●	
	DriveWizard Plus Software	*				●		●

* Free download via yaskawa.com

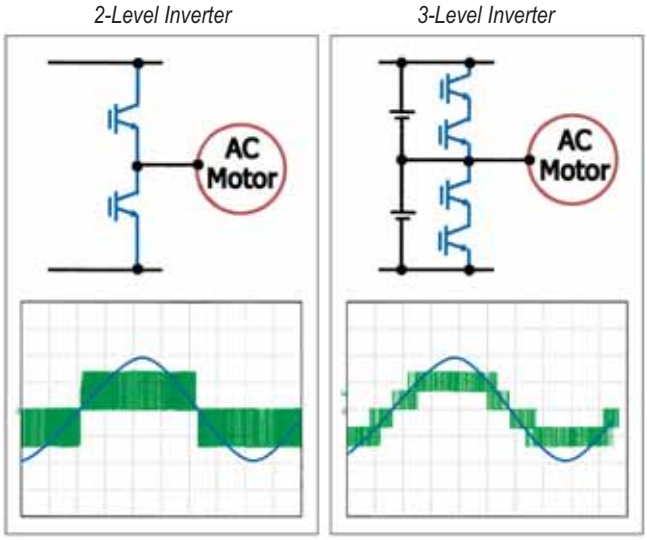
Advanced Technology

G7 Three-Level Inverter

The 480V rated G7 drive, with its 3-level power section, can solve major installation and reliability problems found in today's industrial plants including:

- Motor winding failures caused by high surge voltages in long cable lengths between the motor and drive.
- Motor bearing failures caused by bearing currents (shaft voltage).
- Instrument and measurement malfunction caused by common mode current (noise).

The 3-level inverter has a circuit configuration consisting of 12 IGBTs (instead of 6) that facilitates access to the DC bus mid point. This topology is referred to as a neutral point clamped architecture. This configuration has three DC bus levels compared to two in a conventional PWM drive.

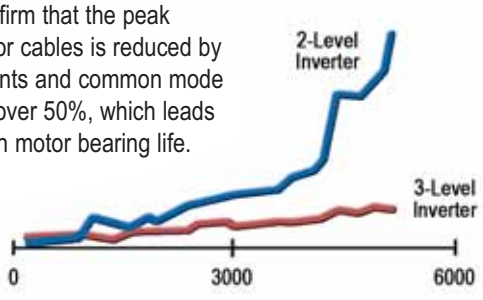


Comparison of Inverter Output Circuits (1 Phase of 3 Shown) and Line-to-Line Output Voltage Waveforms

The result is an output waveform that is more sinusoidal and that switches in steps of 325VDC instead of 650VDC. The reduced output voltage step significantly reduces the surge (peak) voltage seen at the motor and the common mode voltage produced by the inverter. Common mode voltage is the cause of bearing currents and common mode noise.

Measurements made comparing the G7 to a conventional inverter confirm that the peak voltage seen in long motor cables is reduced by up to 33%. Bearing currents and common mode currents are reduced by over 50%, which leads to a four times increase in motor bearing life.

Thirteen patents were awarded to Yaskawa relative to this technology. Although the topology has been seen in large medium voltage inverters, Yaskawa is the first to offer it at 480V and across the entire integral horsepower range.



Motor Bearing Vibration and Wear vs. Hours of Operation

After 5000 hours of motor operation, bearing vibration and wear are still normal with 3-level inverter output, extending bearing life to 4 times that of 2-level inverter operation.

Auto-tuning

The V1000, P7, F7 and G7 drives support several methods of Auto-tuning. Auto-tuning is the process in which, after the user enters basic motor nameplate data, the drive analyzes the motor and calculates several key parameter settings needed for maximum performance. This allows the drive to be used with virtually any motor without complicated setup. The 3 Auto-tuning methods are explained below.

Resistance Auto-tune

The motor's primary (or stator) resistance is important for several functions including vector control, DC injection braking, high-slip braking, speed search and torque compensation. The resistance Auto-tuning method is primarily used in V/f control where a more rigorous tune is not needed. The motor does not rotate.

Stationary Auto-tune

This method is designed primarily for use when the motor cannot be uncoupled from the load or machine. This method should give satisfactory results for most applications in all control methods. The motor does not rotate.

Rotational Auto-tune
This is the preferred method for vector control performance and will yield the best data for all control modes. The motor must be uncoupled from the load for proper results. The motor will rotate with this method. The rotational Auto-tuning method must be used in the following cases: operation above the motor's rated speed, torque control, and the Open Loop Vector 2 control method in the G7 drive.

High Slip Braking (HSB)

The High Slip Braking function dissipates regenerative deceleration energy in the motor by creating a large slip condition. This function is ideal for high inertia rotating loads such as centrifuges, presses, and blowers; and requires no braking resistor. Braking times can be achieved that are approximately 50% less than the time required to decelerate a load normally. The exact stopping time, however, is machine and load inertia dependent. HSB has the following application considerations:

- HSB functions during motor stopping, not during normal deceleration by reduced frequency reference.
- HSB is not available for continuous regenerative loads such as elevators, winders, or test stands. HSB is not suitable for positioning applications such as transfer machines.
- HSB can only be used in V/f control or V/f control w/ PG.

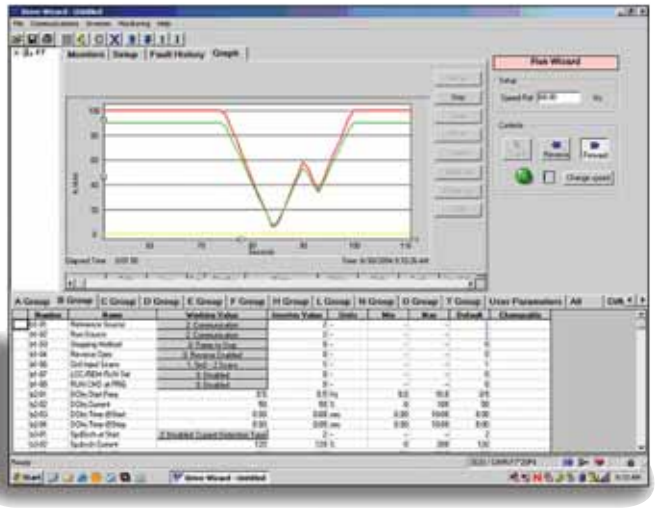
Custom Software

Custom software, sometimes referred to as CASE software, replaces the drive's standard software and adds new functionality or enhances existing standard functions. CASE (Custom Application Software Environment) allows for easy customization by Yaskawa engineers to solve difficult applications and eliminate peripheral equipment. For example, within F7 CASE, the following additional items can be enabled: 30 custom parameters, 8 digital input functions, 3 digital output functions, 2 analog input functions, 10 analog output functions, 5 faults, 5 alarms, custom sequencing (start/stop), and a custom frequency reference.

Existing titles include 1000Hz High Frequency, 1500Hz High Frequency, Electronic Lineshaft, Spindle Orientation, Enhanced PID, Motion Control, and many others. CASE software is available for the F7, G7, P7, V1000 and V74X drives.

DriveWizard™ and DriveWizard™ Plus

These support tools are Windows-based PC programs designed to make commissioning and troubleshooting of Yaskawa drives as simple as possible. These user-friendly programs exchange data with any Yaskawa drive. Data can be retrieved, reviewed, changed, stored, and graphed.



Typical display showing drive monitor graphing function

Parameter Management

- Easy-to-use spreadsheet format
- Parameters arranged in groups
- All parameter attributes displayed
- Parameter list is dynamic to respond to changes in operation modes, options, etc.
- Changes and errors shown in colors
- Mouse click help for each parameter
- Parameter files can be edited offline and used in other applications such as Microsoft Excel

Graphing Function

- Graph any of the drive monitors, up to 8 simultaneously
- Change colors, lines and graph display
- Expand or condense, vertically or horizontally
- Position marker can be added

With these software tools, maintenance personnel can easily maintain a large quantity and any combination of drives.

"Technology... Reliability...
Customer Satisfaction...
The important things"

www.yaskawa.com

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